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The ability of pre-service teachers to design learning plans-based on the principles of Understanding by Design (UbD) using the Learning Management System platform

Jenny Indrastoeti Siti Poerwanti [1, a] *, Sri Marmoah [1, b], Diana Sinziana Duca [2, c]

[1] Universitas Sebelas Maret. Jl. Ir. Sutami 36 Surakarta, Indonesia
[2] Stefan cel Mare University of Suceava. Strada Universităţii 13, Suceava 720229, Romania
[a] Jenny_isp@staff.uns.ac.id; [b] marmuah@staff.uns.ac.id; [c] diana.duca@usm.ro
* Corresponding Author

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Abstract: One of the popular platforms that is widely used in online learning in schools and universities today is a Learning Management System (LMS). LMS serves as a comprehensive platform used in online learning, facilitating educational engagement between educators and learners in remote instruction contexts. The aim of this investigation is to describe the ability of pre-service teachers to design learning designs based on UbD principles through the Learning Management System (LMS) and describe the Involvement of Pre-Service Teachers in using LMS. This study uses descriptive qualitative methods, data collection techniques using documentary analysis and observation sheets. The findings show that the teacher's ability to design learning based on UbD principles through LMS is good. The overall average aspect of the abilities of 30 pre-service teachers is 55% very good, 30.7% good, 11.7% quite good, and only 2.3% were poor, and very poor none. The involvement of pre-service teachers in learning using LMS is good, because more than 85% have actively participated in learning. The implication of this study is to open up new fields of view through modern learning design, provide new learning design when improving the learning process, and provide a potential teacher learning experience when using UbD principles for active learning.

Keywords: Pre-service teacher; Understanding by design (UbD); Learning management system (LMS)

INTRODUCTION

Software-based technological breakthrough that may be utilized to help instructors integrate online learning is the Learning Management System (LMS). The usage of the Learning Management System, or LMS, to carry out learning activities in schools is one glaring example of how technology was employed in learning management during the pandemic and is still being used now (Jarot, 2021). The word "LMS" refers to an online learning management system (LMS) used to administer online courses. It may be used to provide materials and assessments, monitor students' progress on exams and materials, provide audio-visual communication with students, and administer numerous additional learning activities that are incorporated into the system (Putra et al., 2020). A Learning Management System (LMS) is already in place in the majority of Indonesian colleges, and it is utilized by both instructors and remote learners (Nguyen, 2021). According to Ajijola, et al. (2021) Lecturers can create quizzes, tests, assessments, monitor student participation, assign assignments, assign materials, receive, and

respond to student work, compile syllabi, upload materials, assign assignments, and engage in intense communication with students and other lecturers through the Learning Management System.

This software can be used in the learning process and can measure the teacher's understanding of the four learning concepts related to teacher competencies, such as pedagogical, professional, social, and personal skills. To use the learning platform, teachers need the skills to use technology, because teachers must first design the system and fill the learning materials into the learning platform. Therefore, teachers are expected to be creative and innovative in their use.

The need for a teaching platform is important for every teacher to support learning activities so that the learning commitment can work actively and be motivated (Prianti, 2022; Budiarti, 2022). Affirmative answers to the development of teacher qualifications, and 86.6% of the respondents agree that the use of educational platforms promotes learning. Teachers and students can achieve and feel many benefits if this LMS is properly and properly implemented. Among them, the first are practical, such as research findings (Anggriawan, 2019; Haeruman et al., 2021), which affirmed that with the help of LMS, learning becomes practical, structured, accessible anywhere and anytime, so you can use it more freely.

In the era of digitization, there is a need to use digital learning platforms such as LMS to facilitate mobile learning for pre-service teachers in professional development programs. This requires the ability of teachers to increase teacher-student communication and participation in learning (Al-Abdullatif & Alsubaie, 2022; Kumar & Bervell, 2019; Rueda C.; Godines, J.; Rudman, P., 2018). Digital learning platforms are commonly used and provide flexibility and interactive e-learning tools. The use of the latest digital technology supports distance education and training by providing an interactive and social learning environment (Alardan, 2020; Alwan & Jeraisy, 2022). Which enables both synchronous and asynchronous communication (Alshareef, 2020; Amin, 2021). Facilitate access to learning activities and provide flexibility, allowing learning to happen anytime, anywhere, and independently. The learning process and results of in-service teachers can also be monitored because they are recorded automatically, so it is very suitable for use in pre-service teacher training. The LMS also supports assessment of learning by scheduling exams, creating quizzes, and importing grades. The institutional LMS allows the faculty to map the learning experiences and assessment with the outcomes defined for each course, with the corresponding bloom's level (Veluvali & Surisetti, 2022). In addition to the advantages of using an LMS for learning, there are also disadvantages, such as the fact that online communication is not as effective as face-to-face communication. In addition, if the internet network is unstable, it will be difficult for participants to receive complete lecture information.

LMS is used in learning in pre-service teacher programs as a tool to facilitate them in learning for teacher certification. One of the courses that must be taken is a course on the principles of effective teaching and assessment. This course discusses the concepts of measurement, assessment, and evaluation, and examines the principles of understanding by design (UbD) in designing learning and assessment, as well as preparing learning and assessment plans based on the principles of understanding by design. Through this course, it is hoped that pre-service program teachers will have the ability to design learning and assessments that suit the needs of students. Understanding by Design (UbD) is a learning approach that focuses on learning objectives and focuses on student learning and understanding (Pertiwi et al., 2019). UbD has backward learning

design principles that are different from other learning designs. The understanding by design (UbD) approach begins with setting learning objectives, making learning assessments, and planning learning (Asari, 2014; Reynolds & Kearns, 2017).

Problem Statement

Based on the results of the interviews with teachers in Surakarta preschool programs, it seems that the learning method using LMS only does so many tasks or worksheets according to the topic of each meeting. This has led to the perception that e-learning is an online assignment that must be completed within a certain period of time. This is because communication is limited to giving and collecting tasks; there is not as much intensive discussion of the concepts covered in a particular topic. While the teaching platform has a section that includes conceptual research that pre-service teachers must review

Online learning describes the concept of learning at home rather than doing home-work. According to Deveci's (2019) experiment, home learning improves student learning outcomes, but Deveci (2019) also highlights that teachers or trainers currently tend to use homework designs. Without the support of appropriate teacher and trainer skills, online distance learning as practiced to date results in substantial learning inefficiencies, leaving trainee teacher program participants feeling bored, demotivated, and missing learning opportunities. It has the effect of loss.

The results of initial observations were also carried out regarding learning using LMS for pre-service teachers in the elementary school teacher education program (PGSD FKIP UNS), it was found that the involvement of pre-service teacher participants in the learning process was less than optimal, as was their activeness in responding to assignments and discussion activities carried out. Online and offline, only 20% of participants actively provided arguments for ideas or asked questions. In uploading assignments on each topic, there are still many who are not on time, resulting in assignments piling up and instructors having difficulty providing feedback and assessing them. Some participants only copied and pasted the previous year`s assignments, this could be seen from the results presented and uploaded to the LMS system. There are still many tasks related to designing learning designs by applying the principle of understanding by design (UBD) that do not match the objectives with the assessment instruments.

Related Research

The study refers to Fakhrutdinova and Nurkhamitov (2016), said that LMS has the potential to be an important differentiator in embedding or enhancing interactive learning between participants. LMS also supports the assessment of learning through the scheduling of exams, creation of question papers, and import of marks. A study by Rohaeti et al. (2021), based on the results of the validation and use of her LMS-based team instructional design for visually impaired students, found that students were shown to be able to successfully utilize her LMS in their learning. The same results were also shown in Anugerah and Kusuma (2021) stated that LMS is the most preferred online medium by students compared to other online platforms. Using an LMS for learning is very effective as it has the advantage of making it easier for students to find study materials and search for additional learning resources. Meanwhile, Haeruman et al. (2021) state that LMS is one of their facilities that supports students in education to learn from home.

This article will discuss the use of LMS in increasing the competency of pre-service teachers in designing learning designs that refer to UbD (understanding by design) principles, and teacher Learning Engagement in using the LMS. A lot of LMS provide many features, which help instructors in designing formative assessments. On the other hand, for summative assessments. LMS provides the functionality of rubrics and grading forms. Subsequent research was carried out by Snoke (2019), who concluded that teaching design with the UbD framework is effective in the development of teachers' teaching behaviours. Further relevant research was performed by Tauhidah, et al. (2021), showed that utilization e learning platforms amid and post-pandemic ought to be assist moved forward with the assistance of colleges and government, as well as the teacher themselves. The use of digital platforms in learning is effective in supporting prospective teachers to engage in the acquisition and development of cognitive and practical competencies in learning design (Gameil & Al-Abdullatif, 2023). The UbD approach points to extending a more profound understanding by including students more effectively. Instructors are required to be more imaginative and inventive, not as it were being the center of the learning process (instructor-centered), but rather putting students as the center of learning (student-centered).

The novelty of this study is that this article examines the utilization of e-learning platforms to move forward pre-service teachers' capacities in planning learning plans based on the standards of understanding by design (UbD). The UbD is an instructional design model developed by Wiggins and McTighe (1998). The model is based on the 'understanding' of learners. 'Understanding' refers to the ability to adapt the information created by learners throughout the process for all new environments to be encountered, rather than understanding the information in lessons (Taiyabi, 2021; Wiggins & Mc Tighe, 2005).

Research Objective

Based on the background of the problems described above, the aim of this study is to describe the competency of pre-service teachers in designing learning designs that refer to UbD (Understanding by Design) principles through the Learning Management System (LMS) and describe the involvement of pre-service teachers in using the LMS. Through the purpose of this study is to provide an overview of strategies and elementary school teachers in creating learning designs using LMS and implementing them into the learning process of elementary schools.

METHOD

Research Design

In this study, a qualitative technique was combined with a descriptive research method. According to the researchers, the study's main considerations took the shape of a thorough understanding of pre-service teachers' competency in creating learning designs that make references to the principles of UbD (Understanding by Design) and teacher learning engagement when utilizing the LMS.

Sample and Data Collection

The respondents were teachers who conducted lectures on principles of effective teaching and assessment courses for the 2023/2024 academic year through the LMS platform, with a total of 30 students, including 22 women and 8 men.

The data include detailed descriptions of specific situations, activities, or events, or phenomena; the opinions of knowledgeable people, including their perceptions, attitudes, beliefs, and ways of thinking; and documentation based on reporting documents and archives. Several data collection techniques include observation, interviews, and document analysis. (Sugiyono, 2019). The data collection technique used is a documentary research technique in the form of lesson planning tasks prepared by pre-service teachers using UbD principles. Documentary techniques demonstrate the teacher's ability to apply UbD principles in lesson planning. Apart from document techniques, observation techniques are also used to describe the involvement of pre-service teachers in using LMS as a learning tool to design learning designs. So, the data collected includes data on the teacher's ability to design learning according to the principles of Understanding by Design (UbD) during the learning process using the LMS, as well as data on the teacher's involvement during the learning process.

The learning performance of teachers intending to use the LMS was examined from an observation sheet containing LMS learning performance indicators. The evaluation of this observation sheet consists of determining the percentage of effort of each teacher to participate in the learning process using the LMS. Figure 1 shows the methods used to gather information about teachers' abilities to design learning models based on Understanding Design (UbD) principles. The arrows show the sequential steps of lesson planning.

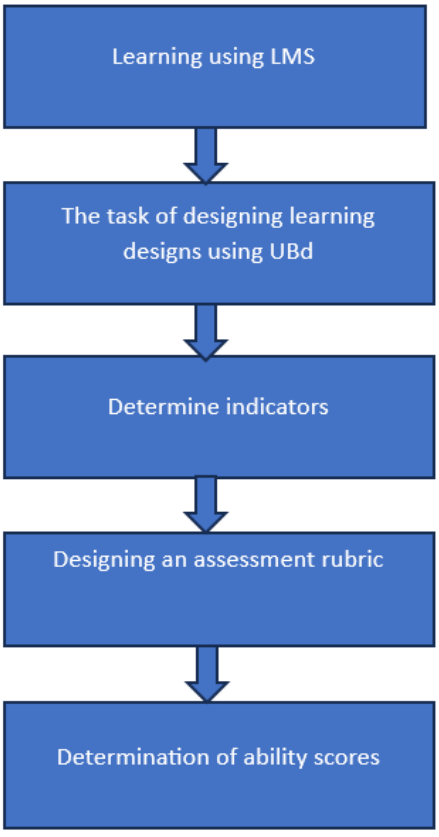

Figure 1. The sequential steps of lesson planning

Analysis of Data

Analysis of research data is a process of systematic searching and compilation of the obtained data. Data analysis was performed with reference to the Miles and Huberman concept (Miles & Huberman, 2016). There are three steps in data analysis: data reducti-

on, data presentation, and retraction. The data reduction performed in this study is to select and simplify the data associated with new study variables. Before discussing the results, we first reduce the data and sort it by data/information that is not related to the research indicators. The presentation of the data conducted in this study describes a collection of information related to teachers' ability to design learning using UbD principles, selected to facilitate drawing conclusions. Retracting conclusions from the study. This is done by determining the significance of the data presented. The data for the three analysis steps are depicted below:

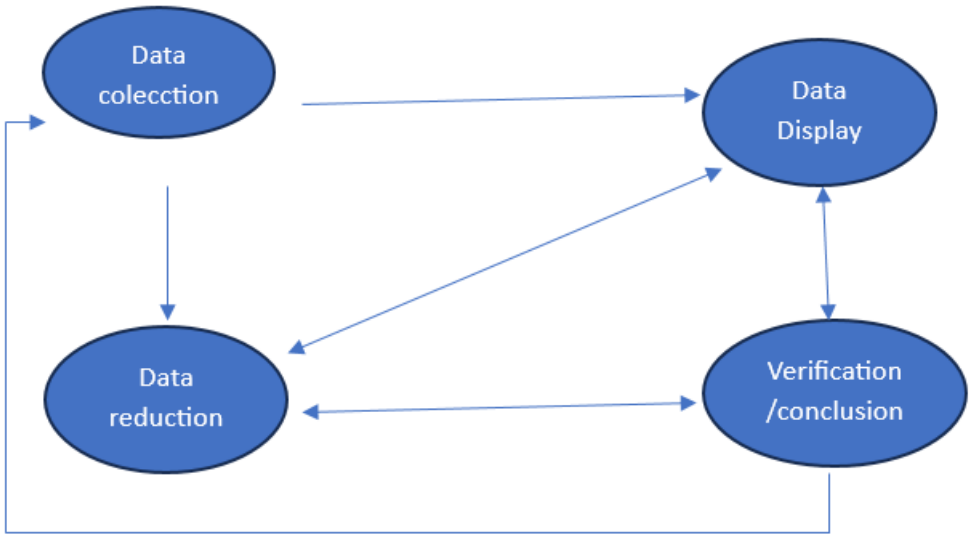

Figure 2. The three analysis steps

Data Validation

Data validity uses triangulation techniques, comparing data with various data collection techniques. Triangulation for the validity of this research data uses technical triangulation and source triangulation.

RESULT AND DISCUSSION

This research focuses on the competence of pre-service teachers in designing learning using UbD principles in learning using LMS, namely the ability to determine objectives, determine assessments, and determine learning activities, as well as teacher involvement in the learning process.

Based on data analysis using interactive analysis, data on in-service teachers' abilities to create learning designs based on UbD principles were obtained. The fundamentals of UbD learning design are identifying desired outcomes, identifying assessment evidence, and planning learning experiences and teaching experiences. Therefore, to find out the teacher's ability to design learning based on UbD, you can learn through the homework results document uploaded on the LMS site. To find out the teacher's ability to design learning based on UbD, which can be obtained through the assignment results documents uploaded on the LMS page. The indicators for each principle are as follows: (1) map core competencies, indicators, and learning experiences, (2) identifies learning resources based on established goals,(3) identifies assessment processes, (4) identifies types of assessment, (5) designing assessment instruments, (6) developing learning steps and adhering to objectives and themes, (7) determine the allocation of learning time, (8) determine how to motivate students, (9) determine how to organize students

and (10) design trigger questions. The results of the data on the ability to design learning using UbD principles in learning using LMS are presented in Table 1.

Table 1. The ability of pre-service teachers to design learning plans based on UbD learning principles

No.	Aspect	Indicator	Very good	Good	Fair	Poor	Very poor
1.	Identifying desired outcomes	- Map core competencies, indicators, and learning experiences	63%	17%	13%	7%	0
		- Identifies learning resources based on established goals	50%	33%	14%	0	3%
2.	Identifying assessment evidence	- Identifies assessment processes,	17%	60%	20%	3%	0
		- Identifies types of assessment	70%	23%	7%	0	0
		- Designing assessment instruments	40%	37%	20%	3%	0
3.	Plan learning and experiences, and teaching experiences	- Developing learning steps and adhering to objectives and themes	50%	40%	3%	7%	0
		- Determine the allocation of learning time	73%	20%	7%	0	0
		- Determine how to motivate students	57%	27%	16%	0	0
		- Determine how to organize students	70%	20%	10%	0	0
		- Design a trigger question	60%	30%	7%	3%	0

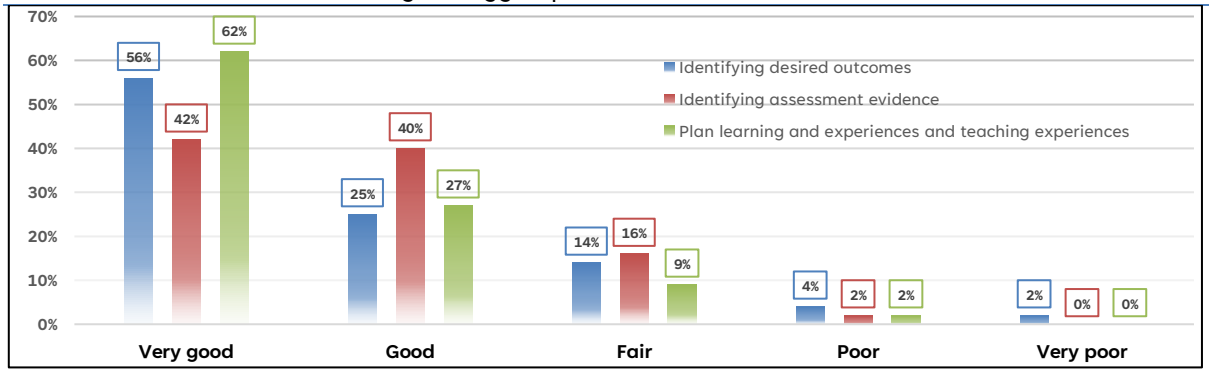

Figure 3. Average ability of pre-service teachers to design learning plans based on UbD learning principles

From the Table 1 and Figure 3, the average ability of 30 prospective teachers as measured by the results of the task of preparing learning designs using UbD principles is as follows; (1) in the aspect of determining learning objectives, 56% are very good, 25% are good, 13.5% are quite good, 3.5% are not good, and 1.5% are very poor. (2) In the aspect of determining assessment evidence, 42.33% were very good, 40% were good, 15.66% were quite good, and there were no abilities that were not good. (3) In the learning planning aspect, 62% are very good, 27.4% are good, 8.6% are quite good, 2% are poor, and none have very poor abilities. The overall average aspect of the abilities of 30 pre-service teachers is 55% very good, 30.7% good, 11.7% quite good, and only 2.3% were poor, and very poor none. In the aspect of determining learning objectives, the abilities of pre-service teachers are very good. To determine learning objectives, teachers should examine which materials should be mastered by the students, including the competencies students should have based on the existing curriculum standards (Mills et al., 2019). In the aspect of determining learning objectives, the abilities of prospective teachers are very good. To determine learning objectives, teachers must examine what material students must master, including the competencies that students must have

existing curriculum standards (Mills et al., 2019). Designing learning using UbD, which is also called backward design, is a valuable planning model that may increase student learning and collaboration with faculty. The designed learning design and activities must be related to the learning objectives, ie, which steps and activities must correspond to the defined objectives. In other words, the designed activities pay attention to learning objectives and allow students to complete the material when conducting the assessment. In the reverse order, when designing a lesson, there may be a central connection between the learning design components, goals, evaluation, and learning steps.

Evaluation evidence should reflect the desired outcomes in line with the goals set at the beginning of the learning design. Assessment results are documented and verified to demonstrate that learning objectives were achieved. This is done to enhance learning and focus. The ability of pre-service teachers in designing using UbD in the aspect of determining assessment evidence, an average of 42.33% of teachers is very good, 40% is good, and 15.66%`s ability is quite good. It can be concluded that the ability of pre-service teachers in the aspect of determining assessment evidence in the UbD design is good, because on average, 99.99% have succeeded in this aspect; the remaining 2% have less ability on average. The aspect of the teacher's ability to determine assessment evidence is very important in designing learning based on UbD. By considering whether the questions can reflect students' performance, you can conduct an assessment and ultimately determine whether the students' learning objectives have been met (Kuntari et al., 2019). Evidence of learning can be assessed through performance tasks, quizzes, tests, academic advising, homework, journals, etc., as well as student self-assessment (Kuntari et al., 2019)The lesson plan is sometimes called the heart of the lesson plan. The ability of pre-service teachers to plan UbD-based learning is achieved during learning tasks in the learning management system (LMS)

Regarding the planning of learning activities using appropriate teaching methods according to the UbD methods, the average ability of the teachers in training is good, 62% of the skills are very good, 27.4 are good and 8.6 very good, 2% not good Therefore, it can be concluded that 98% of pre-service are good at planning learning activities based on UbD is good, the remaining 2% are poor. The learning methods and activities that are proposed must refer to the learning objectives, and the components and activities that must be included in the set objectives. The UbD approach ensures that teachers clarify learning objectives to be achieved, plan learning and assessments around these objectives, and ensure student learning through understanding (Wiggins and McTighe in Joshi, 2021).

Pre-service Teachers' Learning Engagement in Using LMS

The involvement of a service teacher in learning through LMS is a signal to increase the psychological commitment of students to stay involved in the learning process to acquire knowledge and develop critical thinking. It is also associated with the learner's feeling of personal motivation in the course, to interact with the course contents, tutors, and peers, respectively (Czerkawski & Lyman, 2016).

One way to measure student engagement in the classroom as well as in an online learning environment (LMS) is to use an online observation guide. Indicators of pre-service teachers' active involvement in the learning process during the learning process using LMS are (1) involvement in asking, (2) answering, (3) discussing, (4) presenting assignments, (5) uploading assignments (6) looking for material sources (7) deliver sug-

gestion The results of data on pre-service teacher involvement in online learning using LMS are as follows:

Table 2. Pre-service Teachers' Learning Engagement in Using LMS

No.	Indicator	High	Moderate	Low	Very Low
1.	Asking question	70%	30%	0%	0%
2.	Answer question	50%	40%	7%	3%
3.	Discussing	57%	30%	3%	10%
4.	Presenting assignments	53%	27%	10%	10%
5.	Uploading assignments	53%	40%	7%	0%
6.	Looking for a material source	60%	30%	3%	7%
7.	Deliver suggestions	50%	40%	10%	0%
	Average	56.14%	33.86%	5.7%	4.29%

From Table 2, a graph can be made as presented in Figure 4

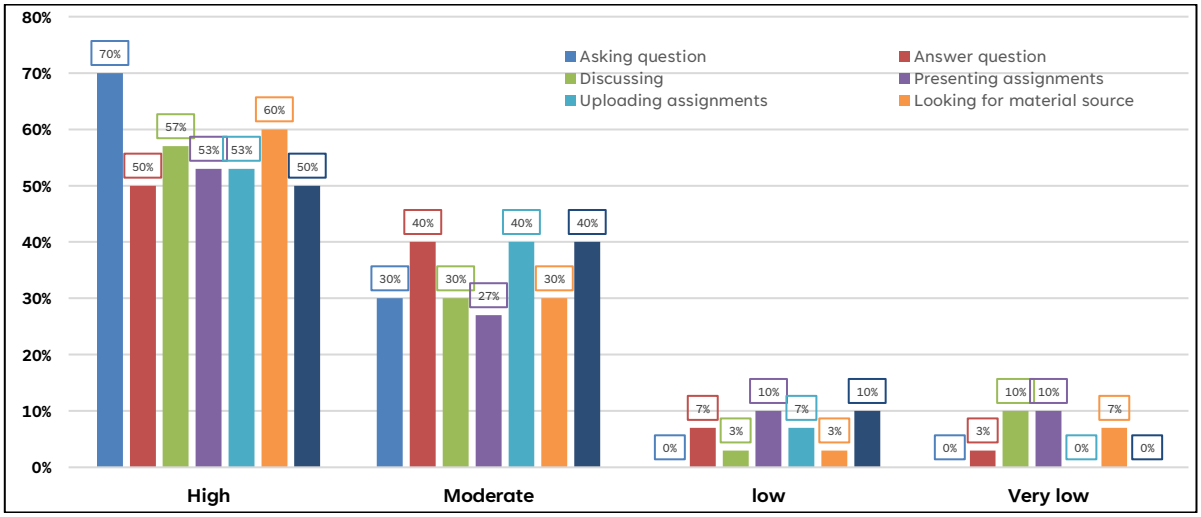

Figure 4. Graph of pre-service teachers' learning engagement in using LMS

The results of observations of the average active engagement of pre-service teachers based on indicators in learning using LMS, 56.14% had high involvement, 33.66% were in the medium category, 5.7% were in the low category, and 4.29% were in the very low category. Most students prefer to focus on completing assignments on the LMS, because it will provide access to continue to the exam after completing several assignments. So even though their involvement tends to be less, they are still involved in taking online lectures. From the analysis of the results of teacher involvement in LMS learning, it can be said to be very good, because the majority, namely 56.15%, is very high, namely more than half of the participants are actively involved, and 33.86%, the involvement is quite good. In-service teachers are braver to ask questions, give opinions, and discuss because brave learning reduces feelings of discomfort and allows for more relaxed learning (Hasanah et al., 2020; Sadikin & Hamidah, 2020)

Online learning allows students to more independently research and find other references to support the material provided in a short period of time. This allows students to quickly understand the material and complete all tasks within the set deadline. Students also take more responsibility for completing their assignments.

CONCLUSION

The ability of pre-service teachers to design learning based on UbD principles taught using LMS has been achieved. The overall average aspect of the abilities of 30 pre-ser-

vice teachers is 55% very good, 30.7% good, 11.7% quite good, and only 2.3% were poor, and very poor none. The ability of prospective teachers to design learning based on UbD principles taught using LMS has been achieved. The overall average aspect of the abilities of 30 prospective teachers was 55% very good, 30.7% good, 11.7% quite good, and only 2.3% poor, and very poor, none. Active involvement in learning using LMS is high, 56.14% are actively involved, and 33.86% are quite active, while the remaining 5.7% are less, and 4.29% are very less. However, overall all the involvement of pre-service teachers in learning using LMS is good, because more than 85% have actively participated in learning

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